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10/583,854	06/21/2006	Takuya Tsukagoshi	128481	8602

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OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
CHANG, AUDREY Y	
ART UNIT	PAPER NUMBER
2872	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/583,854	TSUKAGOSHI ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,6-8,10,12-14,17 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3, 6-8, 10, 12-14, 17 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on September 12, 2008, which has been entered into the file.
- By this amendment, the applicant has amended claims 1, 3, 6-8, 13-14, and 17 and has canceled claims 2, 4-5, 9, 11, 15-16 and 18-19.
- Claims 1, 3, 6-8, 10, 12-14, 17 and 20 remain pending in this application.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1, 3, 6-8, 10, 12-14, 17 and 20 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 has been amended to include the phrase "a number assigned to each of the data pages in which the same number is assigned to the same recording area on the line in each of the holographic recording layers". This phrase is very confusing and not sure what is this "same number" referred to. There is just one recording area along the line in each of the recording layer. Does this mean for all the recording layers, the number is the same? But for different recording layer, even the areas lie along the same line, the areas cannot be identified as the "same recording area".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 6-8, 10, 12-14, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Goulanian et al (PN. 7,321, 540) in view of the patents issued to Spitz et al (PN. 4,052,706), Meyruels et al (PN. 7,200,097) and Jeganathan et al (PN. 5,844,700). Claim 1 has been amended significantly that necessitate the new grounds of rejection.

Goulanian et al teaches a *multilayer holographic data storage* with data accessing method included wherein a *plurality of data pages* having *data blocks structure* as shown in Figure 3 is recorded in a multilayer structure of holographic storage medium having *a plurality of recording layers* (11_i, Figure 1a, with "i" being the identifier for the layer number). The data pages can be *angle multiplexed* recorded in each recording layers, (please see Figure 1a and 16, column 8, lines 5-14 for the angle multiplexing method). The multilayer structure of the recording layers is formed by laminating the recording layers as shown in Figure 1a. Goulanian et al teaches that while accessing the data recorded, a *layer and row accessing unit* (30, Figure 5, column 5, lines 1-8) is used to access the data according to specified layer and data page at the specified row. Goulanian et al teaches that each recording layer is identified by symbol "i" that serves as *the layer number* and hologram for each data page on the recording layer is identified by *row index* "j" and *index* "k" that serve as *number assigned to the data page*. The hologram is therefore identified as 14_{ijk}, that is specified by layer number and data page number. And the accessing method via the layer and row accessing unit is based on the identifiers stated above.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the data blocks contained in each data page is further identified by a number assigned to the blocks and the block of the data can be accessed via the assigned block number. **Spitz** et al in the same field of endeavor teaches *a data page* including a plurality of data blocks (9 data blocks as shown in Figure 2) that each data block can be accessed. The data blocks in each page can certainly be identified

by a number for indicating row and column location of the block. It would then have been obvious to one skilled in the art to apply the teachings of Spitz et al to further identify the data blocks of each data page of Goulanian et al (as shown in Figure 3) by number assigned to individual block with column and row indicators to further access the data blocks of each data page in the holographic storage medium for the benefit of allowing individual data block be accessed and read.

Claim 1 has been amended to include the phrase that the angle-multiplexed method is achieved by using a single or common reference beam and a plurality of object beam having different incident angle to the respective holographic recording layers. One skilled in the art must understand that angle-multiplexing recording method is achieved by varying the angle between the reference beam and object beam for bearing the data to be recorded. The angle variation can be achieved either by varying the incident angle of the object beam or the reference beam. **Goulanian** et al demonstrates one of the methods, by varying the incident angle of the reference beam as shown in Figure 16. Meyruels et al in the same field of endeavor demonstrates a different method by using a common reference beam and a plurality of object beams each with a different incident angle, (please see Figure 1B). It is therefore obvious to one skilled in the art to adapt the method and arrangement of Meyruels et al as an alternative method for achieving the same angle-multiplex recording. Meyruels et al further teaches that in the retrieving process, the common reference beam is illuminated the recording medium wherein a plurality diffracted beams along the directions of the original object beams are reconstructed and a plurality of detectors are used to receive and detect each of the reconstructed object beam.

Claim 1 has further been amended to include the phrase that the data pages are also recorded by shift multiplexing method. Goulanian et al reference however does not teach such explicitly. But shift multiplexing method is one of standard multiplexing methods known in the art to increase the recording density of hologram. As explicitly demonstrated by **Jeganathan** et al that by combining spatial or shift multiplexing and angle multiplexing, the recording density of hologram would increase sharply due to the

partial overlapping of the recorded hologram data, (please see Figure 1B). It would then have been obvious to one skilled in the art to apply the teachings of Jeganathan et al to record the data pages also with shift or spatial multiplexing method to increase the density of recording sharply.

Claim 1 has also been amended to include the phrase such that "same number is assigned to the same recording area on the line in each of the holographic recording layers". This phrase is confusing and rejected under 35 USC 112, second paragraph for the reasons stated above. This can only be examined in the broadest interpretation. As shown in Figure 1a of Goulanian et al, the number for the **same** recoding area in a holographic recording layer along a line, such as the line perpendicular to the layers or the line along the reading light, is the row number. So row number is the same for all the recording areas in the row.

Claim 1 has also been amended to include the phrases concerning the reading beam to have the same wavelength and same angle for as the recording beams. Such are implicitly met by the disclosure of all the cited references, since these are the necessary criterions for recording and retrieving holograms.

Claim 1 has further been amended to include the phrase of rotating the multi-layer holographic recording medium for read out. Goulanian et al teaches to use an angle deflector to change the incident angle of the reading beam for accessing the angle-multiplexed recorded data. Jeganathan et al teaches to rotate the recording medium to allow the angle-multiplexed recorded data be read out. It would have been obvious to one skilled in the art to modify the access method by rotating the recording medium as an alternative method to read out the angle-multiplexed recorded data.

With regard to claim 3, the number for specifying the data blocks has to include a row number and column number since the data blocks (as shown in Figure 3 of Goulanian et al and Figure 2 of Spitz et al) are arranged in two dimensional matrix with rows and columns.

With regard to claim 6, it is implicitly true that the photodetector array (50) of Goulanian et al has same two dimensional arrangement with the arrangement of data pages in order to receive the reproduced

data from each pages row-by-row, (please see Figure 5). Although this reference does not teach explicitly that the photodetector array are comprised of imaging devices, but as shown by Meyruels et al CCD or charge couple device, which is an imaging device, is a well known photodetector. It would then have been obvious to one skilled in the art to use a standard CCD as the photodetector. With regard to **amendment** of claim 6, **Meyruels** et al teaches explicitly that different photodetector is used for receiving and detecting reconstructed object beam from the angle-multiplexed recorded data. This means the photodetector can be assigned with the same number as the number for the specific data page being detected.

With regard to claims 7-8, 12, and 17, Goulanian et al teaches that the data accessing process involves successively accessing each data page with the layer and row accessing unit (30). The holographic recording layer can be changed for the accessing process. However it does not teach explicitly that a process of simultaneously reading a plurality of data pages. **Meyruels** et al teaches the data pages may also be recorded in angle multiplexing scheme disclosed such that a single reference beam (410, Figure 4) is used to simultaneously read out a plurality of data pages recorded, (please see Figure 4). It would then have been obvious to one skilled in the art to apply the teachings of **Meyruels** et al to modify the recording so that a plurality of data pages can be simultaneously retrieved as an alternative way of recording to provide option for simultaneously reading out data. The retrieving or reading process is achieved necessarily by illuminating a single laser to the holographic recording medium.

With regard claim 13, **Goulanian** et al teaches that the reproduced holographic data, according to layer and rows are received and detected by photodetector array (50, Figure 5) but it does not teach explicitly that the layer number of the recording layer is identified by number assigned to each of two-dimensional optical detectors such that each of the detectors is provided for a respective one of the holographic recording layer. However whether to have specific photodetector for specific recording layer or not, does not affect the function of having photodetector array to detect the reproduced holographic

data according to each recording layer. **Meyruels** et al in the same field of endeavor teaches a angle multiplex recorded holograms in recording medium wherein each reproduced data page is detected by an independent detector (CCD) as shown in Figure 4. It would have been obvious to one skilled in the art to modify the arrangement of the photodetector array (50) of **Goulanian** et al to arrange them so that the detector is identified with the specific recording layer to make the detected holographic data with better identification and organization. It is implicitly true that the data pages reproduced are along the optical path of the reading beam.

With regard claim 14, Goulanian et al teaches that the reproduced holographic data, according to layer and rows are received and detected by photodetector array (50, Figure 5) but it does not teach explicitly that the layer number of the recording layer is identified by number assigned to each of two-dimensional optical detectors such that each of the detectors is provided for a respective one of the holographic recording layer. However whether to have specific photodetector for specific recording layer or not, does not affect the function of having photodetector array to detect the reproduced holographic data according to each recording layer. Meyruels et al in the same field of endeavor teaches a angle multiplex recorded holograms in recording medium wherein each reproduced data page is detected by an independent detector (CCD) as shown in Figure 4. It would have been obvious to one skilled in the art to modify the arrangement of the photodetector array (50) of Goulanian et al to arrange them so that the detector is identified with the specific recording layer to make the detected holographic data with better identification and organization. The detection of the data has to be along the optical path of the reading light.

With regard to claims 10 and 20, Goulanian et al teaches that the data accessing process involves successively accessing each data page with the layer and row accessing unit (30). The holographic recording layer can be changed for the accessing process.

Response to Arguments

5. Applicant's arguments filed on September 12, 2008 have been fully considered but they are not persuasive. The newly amended claims have been fully considered and they are rejected for the reasons stated above.

6. Applicant's arguments are mainly drawn to the newly amended features of the claims they have been fully addressed in the reasons for rejection above.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (9:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.
/Audrey Y. Chang/
Primary Examiner, Art Unit 2872